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Optimización del entrenamiento en artes marciales mediante ejercicios de gymnasia

Optimising martial arts training by using gymnastics exercises

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Abstract

Engaging in high-performance competitions (World Combat Games, World Championships, European and/or Balkan Championships) has made it necessary for the martial technique to have the benefit of knowledge from other sports disciplines as well, particularly gymnastics, in order to give greater weight to competition artistic programmes which, throughout the world, reach degrees of complexity that had not been encountered until a few years ago. The research objectives from our study aims to are to elaborate a concise and efficient material on the factors that have led to the achievement of the performance presented in the preamble of the paper; highlight the suitability and efficiency of training and research methods; elaborate concrete proposals for strengthening and expanding activities on how to conduct future training programmes etc. The combination of Ju-jitsu technical elements and artistic and rhythmic gymnastics elements can contribute to achieving a high performance and consolidating motor skills and competences for to increase the performance of sports. Methods used, statistical parameters and the value of interpretations allowed the generating a differences between the two groups rise from the implementation of superior Ju-jitsu techniques a specifics elements of gymnastics, from the use of mental training and relaxation techniques which, in time, have led to strengthening the psychological skills of increasing the concentration power in conditions of high stress, and, implicitly, to developing some complex abilities and reflexes.

The training period, the development and completion of the experimental programme, have allowed us to confirm the elaborated hypothesis and achieve remarkable performances.

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Keywords

Athletes; motor skills; sports training; experimental program.

Resumen

Participar en competiciones de alto rendimiento (Juegos de Combate Mundial, Campeonatos Mundiales, Campeonatos Europeos y/o Balcanes) ha hecho necesario que la técnica marcial se beneficie del conocimiento de otras disciplinas deportivas, en particular gimnasia, para dar mayor peso a los programas artísticos de competición que, en todo el mundo, alcanzan grados de complejidad que no se habían encontrado hasta hace unos años. Los objetivos de investigación de nuestro estudio tienen como objetivo elaborar un material conciso y eficiente sobre los factores que han llevado al logro del rendimiento presentado en el preámbulo del documento; resaltar la idoneidad y eficiencia de los métodos de capacitación e investigación; elabore propuestas concretas para fortalecer y ampliar las actividades sobre cómo llevar a cabo futuros programas de capacitación, etc. La combinación de Jiu-jitsu elementos técnicos y elementos de gimnasia artísticos y rítmicos puede contribuir al alcanzamiento de una interpretación alta y consolidación de habilidades físicas y competencia para aumentar la crecimiento de las perfomanencias en el deporte. Los parámetros usados, estadísticos de los métodos y el valor de interpretaciones permitieron la generación de unas diferencias entre la dos subida de grupos de la realización de técnicas suoriores de Jiu-jitsu y elementos específicos de la gimnasia, del uso de técnicas de entrenamiento mental y relajación que, con el tiempo, han llevado a fortalecer la psicología. Habilidades para aumentar el poder de concentración en condiciones de alto estrés e, implícitamente, para desarrollar algunas habilidades y reflejos complejos.

El período de capacitación, el desarrollo y la finalización del programa experimental, nos han permitido confirmar las hipótesis elaboradas y lograr resultados notables.

Palabras clave

Atletas; habilidades motrices; entrenamiento deportivo; programa experimental.

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Introduction

In the field of martial arts, mainly the Ju-jitsu style, it is necessary to have constantly sought to increase the mental, physical and technical performances, using both traditional training methods and the latest scientific breakthroughs in the field of theory and practice of sports training. Each teacher has his/her own ideas on the best way to achieve the area of activity in which athletes have to excel to win (Savu, Pehoiu, 2018).

In evolution of high-performance competitions (World Combat Games, European and/or Balkan Championships) has made it necessary for the martial technique to have the benefit of knowledge from other sports disciplines as well, particularly gymnastics, acrobatic and artistic gymnastics, in order to give greater weight to competition artistic programmes which" any artistic experience is a overthrow of senses" (Popescu-Bradiceni, Plastoi, 2014).

According to Savu, Pehoiu, (2018), "care for developing motor skills should be a primary goal, especially knowing that at other stages of motor skills the speed and skill are very difficult or not at all perfectible". Specialised studies point to "characteristics and reaction time of motor skills, responsiveness and motor coordination, thus contributing to optimizing human motor capacity" (Badau, D., Bilgehan, Badau, A., 2018). As, Laborde, Dosseville, Guillén, & Chávez (2014) mentions about the physical skills are manifested independent of the nature of sport, not having a difference between the manifest of emotional intelligence in team sports and individual sports, we can choose an individual sport for approach.

It is more or less known that such researches in the field of martial arts, particularly the Ju-jitsu style (Galan, 2017), are rather scarce or non-existent; generally, specialists in the field and the general public grant special attention to the fighting section – semi-contact fighting - of the style and less to the Demonstrative Duo, the Duo Show system, for several reasons such as:

- the abovementioned sections require higher knowledge of Ju-jitsu, therefore are less approachable (Galan, 2017);
- training for these sections require an amount of time that is 5 times larger than the fight section;

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- demonstrative sections require the activity of a multidisciplinary team (technician, choreographer, athletic trainer, massager, even psychologist etc. and high material resources, while the fighting system is less demanding of these requirements (Galan, 2017).

In order to improve the efficiency of artistic performance of the demonstrative programme, we have borrowed gymnastics elements, such as the unusual starting positions for executing motor actions, exercising of the clumsy segment (performing drills in front of the mirror or contrary to the command), limiting the working space, repetition of basic exercises by increasing their degree of complexity.[6] In sports, we talk about building new competence and performance models (Popescu-Bradiceni, Plastoi, 2014).

For example, learning to take and maintain the body position as natural as possible during combat, in attack, taking over the opponent's initiative by feint and counterattack etc. have been enhanced by adapting gymnastics elements. We have employed body balance and stability exercises by keeping the centre of gravity within the support polygon (standing on tip toes, standing on one leg with the other one in various positions, standing on a narrow surface, walking along the narrow ledge of the bench etc.), physical development exercises performed in tempo and with an increased degree of complexity and coordination of body segments etc. (Chera- Ferrario, 2013).

At the same time, the correction of the ways of harmonious and efficient movement (Galan, 2017) in accordance with the specificity of a certain artistic technique, has been readjusted to the requirements of the artistic and rhythmic gymnastics, using elements of the *unbalance* school, physical activities which are essential for the performance of Ju-jitsu procedures, by exercising rhythmic, acrobatic elements, jump on and over gymnastics apparatus, over partner etc. (Macovei, Buţu, 2007).

Research objectives:

- the evolutive highlighting to the speed response of the athlete as a result after using the proposed exercises programme by calculating the standard deviation, dispersion, coefficient of variation etc., in order to increase the performance of athletes;

-the effective recovery of the physical qualities of athletes and the improvement of their personal values of speed, arm strength, stamina and skill;

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-achieve the increase of sustainability and efficiency by training using the specifics exercises of artistic gymnastics in training programmes.

Hypothesis

The combination of Ju-jitsu technical elements and artistic and rhythmic gymnastics elements contributing decisively to achieving a new higher level of physical skills and the psycho-motor balancing on during of the fight.

Material and Methods

In order to ensure the smooth running of our didactic experiment, we have selected two groups from our club with relatively similar anthropometric indices, similar Ju-jitsu preparation etc. and, very important, with all participants in the experimental programme being members of the representative teams of the club or of national teams, in important competitions such as the National Championship, the Balkan, European or World Championship.

The group of subjects consisted of 48 athletes, aged 16-21, forming the two experimental groups: the experimental group and the control group. Training sessions were conducted on a daily basis, from Monday to Saturday, for 3 hours, at the Budo Seishin Martial Arts Club in Bucharest, Romania.

This experimental programme relied on the total number of participations in various competitions until then but with reference only to the European Championship in Poland. Our research started on 4th January 2018, when teams reunited and accommodation training sessions began – after the winter holiday, in order to prepare for the 2018 competitions.

The test and methods used

⇒ *speed* – 100m/flat,
⇒ *arm strength* – pull-ups on fixed bar,
⇒ *running stamina* – 1000m/flat
⇒ *skill* – covering an applicative track in order to highlight the "skill" motor quality – which consisted of gymnastics elements such as the arabesque, chest roll, rolls etc., in difficult conditions.

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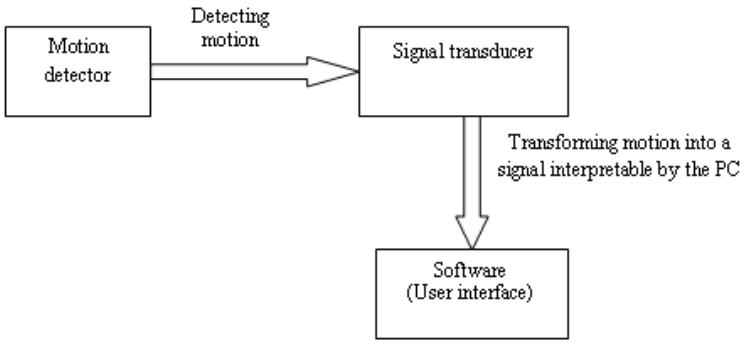
⇒ testing the *speed of response* by means of a device we created in 2005, which has brought satisfactions during the training of our teams, a device we called *REACTOGRAPH* (*Graph 1*):



Graph 1 - Reactograph

The system can measure the time from the issuance of a command until the beginning of the motion as well as the time until system shutdown. Due to the way the sensor works, namely that the transition from the motion to the idle state requires 0.2 seconds, the subject must stand still until the stopwatch is stopped and motion is measured. The sketch of this device is presented in the picture.

⇒ *statistical methods – "T" test – bilateral test; ANOVA - skill test;*

⇒ *other tests* employed: special elements of combat sport-evaluation tests, one-on-one free fight – 2 minute-period, two-opponent combat and the "ruler test".

Program of activity

We deemed it appropriate to expand a number of activities in the period between the two tests, as follows:

⇒ diversification and enhancement of mental, physical, technical-tactic and artistic training by implementing modern methods such as: sets of exercises borrowed from **crossfit**[1]; the use of the **Tabata**[2] **training** once a week or every two weeks – depending on the evolution of the artistic and/or acrobatic programme etc.;

[1] Crossfit is the only fitness programme that has defined the concept of fitness in a way that can be measured, observed, repeated. Training sessions are varied, incorporating gymnastics elements, climbing, throws, Olympic exercises as well as rolls, jumps, sprints. Sustaining the effort involves both the aerobic and the anaerobic system. Training is based on natural, complex, functional movements that are also normally/naturally used throughout the day.

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⇒ continuous improvement of artistic movements by complying with certain aesthetic requirements specific to the acrobatic and artistic gymnastics, which aimed at:

- using static or isometric exercises, with maximum attention to relaxation breaks (isometric contractions over as short a time as possible, 2-4 seriesx10.15sec):
- dynamic exercises called isotonic, which consist in performing a movement in space with the simultaneous participation of muscle groups with a role in failure and defeat, repeated 7-10 times, 5-7 series each.

⇒ acquiring the psychological principles, methods and rules underlying the consolidation of higher elements in martial arts – particularly the Ju-jitsu (elements of combat and crowd psychology, techniques of artistic manifestation of technical elements etc.);

⇒ various theoretical activities: knowledge – including theoretical knowledge – of the subtleties of various technical procedures, of the ways of using different (conventional and/or improvised) weapons, concentration techniques;

⇒ readjusting the technical programme by implementing the best scored technical and artistic elements worldwide etc. These activities, taken as a whole, were carried out in the dojo[3] and in front of the computer, training in nature etc., including free, open discussions or a frank and pragmatic approach of the final objectives.

Analysis of dates

For analysis the dates we use the *Reactograph* (measuring instrument) for testing coordination by covering the applicative track and assessing the speed of response. Application and using the skill test for evaluated the same mental and physical qualities and T test for training program we can get some values from (mathematical average-M(X), Standard error-Es, Median-Me, Module-Mo, Standard deviation-S, Dispersion-D, Amplitude-A, Minimum-Min, Maximum-Max, Coefficient of variability-Cv). Using the statistical hypotheses by the ANOVA test, we can shows the differences noted between the

[2] The *Tabata training* consists in 20 seconds of high intensity exercise followed by 10 seconds of rest. This cycle is repeated 8 times in order to complete a 4-minute workout.
[3] *Practice hall* of martial arts.

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performances achieved by the subjects of the two research groups, where **F=10.64** and **P=0.002,** given a **p**<=0.05.

Results

Initial testing of the speed of response using the REACTOGRAPH

As regards the *speed of response* test using the *REACTOGRAPH* in the first stage of the experiment, the values obtained are shown in the table below.

Table no.1 – Speed of response using the REACTOGRAPH – Initial test

Subjects	Results (s)		Statistical parameters	E.G.	C.G.
	E.G.	C.G.			
1	2.092	0.844	Mathematical average	0.78	0.86
2	0.922	0.984	Standard error	0.06	0.02
3	0.952	0.875	Median	0.69	0.87
4	1.015	0.889	Module	0.56	0.78
5	0.562	0.968	Standard deviation	0.32	0.09
6	0.687	0.813	Dispersion	0.10	0.01
7	0.780	0.687	Amplitude	1.56	0.38
8	0.704	0.749	Minimum	0.53	0.62
9	0.749	0.842	Maximum	2.09	1.00
10	0.624	0.906	Total	18.72	20.56
11	0.624	0.796	Coefficient of variation	0.13	0.11
12	0.671	0.780			
13	0.562	0.624			
14	0.671	0.859			
15	0.765	0.968			
16	0.765	0.922			
17	0.686	0.905			
18	0.672	0.922			
19	0.531	0.859			
20	0.640	0.780			
21	0.534	0.780			
22	0.639	0.999			
23	0.780	0.937			
24	1.093	0.874			

We also believe that the considerations on previous tests hold for this test as well, although the value of differences of previously analysed parameters is somewhat lower. In our

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opinion, this is the most eloquent test in which the homogeneity of the data string of most statistical parameters also increases the general value of the control group characteristics.

Final testing of the speed of response using the REACTOGRAPH

Tabelul no.2 Speed of response using the REACTOGRAPH – final test

Subjects	Results (sec.)	
	E.G.	C.G.
1	0,422	0,359
2	0,672	0,561
3	0,734	0,468
4	0,640	0,468
5	0,780	0,719
6	0,765	0,733
7	0,545	0,186
8	0,421	0,734
9	0,625	0,624
10	0,702	0,702
11	0,797	0,703
12	0,561	0,812
13	0,312	0,671
14	0,406	0,704
15	0,734	0,796
16	0,546	0,859
17	0,547	0,827
18	0,375	1,063
19	0,374	0,249
20	0,374	0,749
21	0,546	0,875
22	0,531	0,672
23	0,531	0,890
24	0,437	0,797

Statistical parameters	E.G.	C.G.
Mathematical average	0,56	0,68
Standard error	0,03	0,04
Median	0,55	0,71
Module	0,73	0,47
Standard deviation	0,15	0,21
Dispersion	0,02	0,04
Amplitude	0,49	0,88
Minimum	0,31	0,19
Maximum	0,80	1,06
Total	13,38	16,22
Coefficientul of variation	0,06	0,09

ANOVA – testing statisticaly null hypotesis

Confidence threshold **set: α = 0.05**
Null hypothesis H_0 :$m_1 - m_2 = 0$
Alternative hypothesis H_1: $m_1 - m_2 <> 0$ (m_i - medie grupa i)
F critical (value of Fisher tables) **= 4.05**
Degrees of freedom between groups - df = 1
Degrees of freedom between in groups - df = 46

Source of Variation	F	P
BETWEEN GROUPS	5,25	**0,03**

P <= 0.05. Statistically, the results of the two tests differ significantly.Null hypothesis is rejected.

Having conducted the control tests in order to assess the level of development of psychomotor qualities, we naturally proceeded to organising the two research groups with a view to evaluating the ability to apply technical and motor knowledge. These requirements were highlighted through the two tests: testing coordination by covering the applicative track and

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assessing the speed of response be means of the Reactograph, with techniques and combinations of techniques assimilated during specific lessons being executed at an audio signal.

Initial testing of mental and physical qualities of the two groups

Table no.3 – Initial testing of mental and physical qualities of the two groups (E.G. – experimental group; C.G. – control group)

Functions	Parameters of mental and physical qualities									
	Speed		Arm strength		Stamina		Skill		Speed of response	
	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.
Mathematical average **M(X)**	12.94	12.86	15.96	16.71	218.58	211.54	81.33	79.71	0.78	0.68
Standard error **Es**	0.05	0.04	0.42	0.28	6.77	7.53	1.20	1.41	0.06	0.04
Median **Me**	12.95	12.90	16.00	17.00	205.50	202.00	80.50	79.50	0.69	0.71
Module **Mo**	13.10	13.00	15.00	17.00	210.00	205.00	75.00	72.00	0.56	0.47
Standard deviation **S**	0.22	0.18	2.05	1.37	33.18	36.91	5.89	6.92	0.32	0.21
Dispersion **D**	0.05	0.03	4.22	1.87	1100.95	1362.43	34.67	47.87	0.10	0.04
Amplitude **A**	1.00	0.70	9.00	5.00	123.00	127.00	25.00	23.00	1,56	0.88
Minimum **Min**	12.50	12.50	10.00	14.00	178.00	183.00	70.00	69.00	0.53	0.19
Maximum **Max**	13.50	13.20	19.00	19.00	301.00	310.00	95.00	92.00	2.09	1.06
Coefficient of variability **Cv**	0.02	0.01	0.13	0.08	0.15	0.17	0.07	0.09	0.13	0.31
Total	310.60	308.70	383.00	401.00	5246.00	5077.00	1952.00	1913.00	18.72	16.22

- **Interpretation of physical quality initial testing results**:

After a first examination of subjects in the two research groups, we noted an acceptable homogeneity of the results obtained and they main tendency had the following statistical values:

For the **speed test**:

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- the average **M (x)** = 12.94 experimental group [E.G.]; 12.86, control group [C.G.], very similar values;
- the median maintained approximately the same uniformity trend with values of 12.95 E.G. and 12.90 C.G.;

Values are quite similar for the other statistical parameters as well, according to the same table 1: Module, Standard deviation, Amplitude, Minimum – identical for both groups, Maximum and Coefficient of variability for the 'speed' test.

Although the amplitude value – **A=1.00** for E.G. and **A=0.70** for C.G., resulted from the difference between the maximum value **MAX** = 13.50 and the minimum value **MIN** = 12.50 for E.G., and 13.20 Max. and 12.50 Min., for C.G., points to a certain dissimilarity, we believe that homogeneity is acceptable, slightly favourable to the Experimental Group, values which reveal a slight asymmetry to the left (in this case positive) of the string of results obtained.

Some differences between the individual and average results of subjects in the two research groups may be observed; these differences are illustrated by trends related to the performances achieved by the subjects of the two research groups.

The first test of the motor quality "SPEED" produced quite similar results, which, we believe, denote an acceptable homogeneity of motor performances of the two groups. Higher value differences were recorded in the other tests: STRENGTH and STAMINA.

Thus, as regards the **'strength' test:**

- while the E.G. recorded a **Min=10.00,** the **C.G.** recorded **14.00,** while the maximum value **Max.** was the same for both groups: **19.00;** having a value of **Dispersion** of **4.22** for **E.G.** and **1.87** for **C.G.**, and the **amplitude A=9.00, 5.00** for **G.C.** respectively, this test had the data string value favourable [clearly] to the control group.
- the same superiority of data was also recorded for the **"strength"** test, in which the aforementioned parameters were favourable to the **C.G.** The only better parameter of the **E.G.** was **standard deviation As,** equal to **33.18, 36.91** respectively for **C.G.,** which points to a better homogeneity for the **E.G.**
- the two other tests (*coordination* and *speed of response*) recorded relatively similar values, slightly favourable to the **E.G.**, thus materialising the superior values of the independent variable applied in this first stage of our experiment.

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Final testing of mental and physical qualities

Table no. 4 – Final testing of mental and physical qualities

Functions	Parameters of mental and physical qualities									
	Speed		Arm strength		Stamina		Skill		Speed of response	
	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.	E.G.	C.G.
Mathematical average **M(X)**	12.72	12.83	17.38	16.46	197.50	210.96	75.63	79.29	0.56	0.61
Standard error **Es**	0.04	0.04	0.19	0.21	1.18	5.59	1.04	1.24	0.03	0.04
Median **Me**	12.70	12.85	17.50	16.00	198.00	203.50	75.00	79.00	0.55	0.59
Module **Mo**	12.70	13.00	18.00	16.00	200.00	200.00	70.00	80.00	0.73	0.66
Standard deviation **S**	0.20	0.18	0.92	1.02	5.78	27.37	5.10	6.09	0.15	0.20
Dispersion **D**	0.04	0.03	0.85	1.04	33.39	748.91	25.98	37.09	0.02	0.04
Amplitude **A**	0.70	0.60	3.00	4.00	22.00	95.00	19.00	23.00	0.49	0.89
Minimum **Min**	12.40	12.50	16.00	15.00	188.00	190.00	70.00	70.00	0.31	0.28
Maximum **Max**	13.10	13.10	19.00	19.00	210.00	285.00	89.00	93.00	0.80	1.17
Coefficient of variability **Cv**	0.02	308.00	417.00	395.00	4740.00	5063.00	1815.0	1903.0	13.38	14.65
Total	305.20	0.01	0.05	0.06	0.03	0.13	0.07	0.08	0.06	0.33

- **Interpretation of mental and physical quality, final testing results:**

Final testing has shown that applying independent variables entailed an increase in the efficiency of the training programme mainly in the case of the E.G (table no.4). Although we evaluated the same mental and motor qualities, using the same test methods for the C.G. as well, the final results were superior in the case of the E.G. Corroborating the numerical results – highlighted by the value of statistical parameters shown in the tables above, we should note the superior mental and moral behaviour of the E.G. during testing. Safety, relaxed executions

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and in accordance with the created technical and tactical situations – in the case of self-defence techniques, as well as the value of parameters of psychomotor qualities have strengthened our conviction that applying the independent variables chosen by us within the activities conducted by the experimental group has been perfectly viable.

ANOVA – skill test

We cannot complete our experiment without using the ANOVA test as well in order to highlight the results of the research. In the tables below we shall exemplify the performances of the groups for the applicative track/*skill test* and the value of statistical parameters during the final testing of groups (table no.5).

Table no.5 –ANOVA -skill test

Subjects	Results (sec.)	
	Control	Experiment
1	82	74
2	70	70
3	87	76
4	70	70
5	80	82
6	80	76
7	85	77
8	90	85
9	93	89
10	70	72
11	88	82
14	80	77
16	78	70
17	75	72
18	80	75
19	81	79
20	77	70
21	78	75
22	82	80
23	75	70
24	76	72

Statistical indicators	Values	
	Control	Experiment
Mathematical average	79.29	75.63
Standard Error	1.24	1.04
Median	79.00	75.00
Module	80.00	70.00
Standard Deviation	6.09	5.10
Dispersion	37.09	25.98
Amplitude	23.00	19.00
Minimum	70.00	70.00
Maximum	93.00	89.00
Total	1903.00	1815.00
Coefficient of variability	0.08	0.07

ANOVA - testing statistical *null hypotheses*

Confidence threshold set: **α = 0.05**
Null hypothesis H_0 :$m_1 - m_2 = 0$
Alternative hypothesis H_1: $m_1 - m_2 <> 0$ (m_i - medie grupa i)
F critical (value in Fisher tables) **= 4.05**
Degrees of freedom between groups - df = 1
Degrees of freedom in groups - df = 46

Source of Variation	F	P
BETWEEN GROUPS	5.12	**0.028**

P <= 0.05. Statistically, the results of the two tests differ significantly. Null hypothesis is rejected.

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- **Interpretation the skill test - ANOVA**

As evidenced by the value of statistical parameters of related statistical calculations (table no.5), one may note a continuous ascendant evolution of the experimental group and it can be seen that of the statistical values was obtained:

- in terms of the final evolution of the motor quality '*speed*' in the final testing, the two groups had the same average of results: 12.83. However, the value of the data string is slightly favourable to the experimental group. Analysing the value of **F=4.40** and **P=0.041**, given a confidence threshold of **p <=0.05**, statistically the results of the two tests differ significantly, hence the null hypothesis is rejected.

- *strength*, the second parameter tested, allowed us to highlight the following values of statistical parameters for the control group: Average=16.46 while Median=16.00, hence a slight positive asymmetry of performances achieved by the subjects of this group.

- for the experimental group, the value of amplitude A=3.00, as a direct result of the difference between MAX=19.00 and MIN=16.00, completes the image provided by the coefficient of variation (Cv=0.05).

- used to test statistical hypotheses by the ANOVA test, we can shows the differences noted between the performances achieved by the subjects of the two research groups, where **F=10.64** and **P=0.002,** given a **p**<=0.05, enabling us to draw the same conclusion (as in the case of the previous text): as statistically the results of the tests of the two groups differ significantly, the null hypothesis is rejected.

Discussions and conclusions

In support of understanding the importance of an interdisciplinary approach in shaping the skills required in contact sports, we can also refer to the mention by Carriedo (2019) "Judo is a grappling combat sport that may generate a wide variety of situations to enrich students' motor skills". The harmoniously manifested motor gesture is very well appreciated both in terms of the competition rules and of the spectators. In the same time, the psychological factor is essential in any field of activity, in martial arts – Ju-jitsu, regardless of the contest section, it is vital in the degree of manifestation by amplitude and techniques elements.

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This training program allowed to participate with a team of 6 athletes competing in 9 events and to obtained two European Champion titles and two bronze medals with the effort of more than 5 months of specific training has paid off. During the training sessions structures of gymnastics elements with various rotations had been implemented, which allowed a more efficient association of specific technical elements and the achievement of an outstanding demonstrative programme for Romanian team.

”The development of emotional factors in the sport context takes on special relevance today, equating it with the training of physical, technical and tactical factors, because emotional factors are closely related to sports performance” (Castro-Sánchez, Zurita-Ortega, Chacón-Cuberos, 2018) and in this way we can say that the differences between the two groups rise from the implementation of superior Ju-jitsu techniques and acrobatic and artistic gymnastics elements, from the use of mental training and relaxation techniques which, in time, have led to strengthening the psychological skills of increasing the concentration power in conditions of high stress.

The focus of the training is to developing some complex abilities and reflexes of mobility and stability for create more effective movements. In order to improve the ability system’s effectiveness in coordinating movement and techniques elements, concepts should be according whit affirmations of Burton & Brigham, (2013). In the same direction, we agree with the idea expressed by Miller & Hung (2016), Huxhold, Schmiedek, and Lindenberger (2006) which who say that mental training and relaxation techniques in association with cognitive function can have an impact on balance control.

However efficient training methods may be and wherever they may come from, only a sufficiently elements of acrobatic, rhythmic or artistic gymnastics in various forms in the field of martial arts, helps maintain the improvement of efficient reflexes, even a dynamic stereotype and adjusted to certain situations.

The training period, the development and completion of the experimental programme, have allowed us to confirm that, the combination of Ju-jitsu technical elements and artistic

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and rhythmic gymnastics elements contributing decisively to achieving a new higher level of physical skills and the psycho-motor balancing on during of the fight.

In order to explore on the maximum potential of each athlete, science continues to bring permanently how the human body being reacts to different daily or competitive factors, supporting through research the growth in potential performance of athletes, so that ”dropping out of competitive sport at a young age is largely contributed to the limited spectrum of information which we have from the athlete” (Chera, Plastoi, 2016), because ”the results indicate that the athletes analyzed show high values in emotional intelligence and its four dimensions, being the most valued, the self-emotional management, and the least valued, the emotional utilization; no association was found between emotional intelligence and the sex of the athletes. Emotional intelligence is directly and positively related to the age of the subjects, and athletes of the collective modality with contact are the best resources of their emotions” (Castro-Sánchez, Zurita-Ortega, Chacón-Cuberos, 2018). In the same way ”in today's society education and not just information is a defining milestone for the future by formulating several definitions of education, it can be said that education is an accumulation, storage, and then a rendering, sometimes filtered, sometimes not, of the perceived perceptions that we perceive for the individual” (Plastoi, 2018).

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